CLAIMS

What is claimed is:

1. A scanning force microscope probe, comprising:

a cantilever having a first end and a second end; and

a reflective structure included on the cantilever such that at least a portion of light that is directed to the cantilever in a first direction having a directional component from the first end to the second end is reflected from the reflective structure in a second direction having a directional component from the second end to the first end.

2. The scanning force microscope probe of claim 1 wherein the first direction is substantially opposite to the second direction.

3. The scanning force microscope probe of claim 1 further comprising a tip disposed on a front side of the cantilever.

4. The scanning force microscope probe of claim 1 wherein the reflective structure comprises a reflective surface disposed on the back side of the cantilever.

5. The scanning force microscope probe of claim 1 wherein the reflective structure comprises a reflective surface disposed on a front side of the cantilever.

6. The scanning force microscope probe of claim 1 wherein the reflective structure comprises a diffraction grating disposed on the back side of the cantilever.

7. The scanning force microscope probe of claim 1 wherein the reflective structure comprises a diffraction grating disposed a front side of the cantilever.

8. The scanning force microscope probe of claim 1 wherein the cantilever comprises silicon.

9. The scanning force microscope probe of claim 1 wherein the cantilever comprises silicon nitride.

10. The scanning force microscope probe of claim 1 wherein the first end is a fixed end of the cantilever.

11. The scanning force microscope probe of claim 10 wherein the fixed end of the cantilever is fixed to a chip having tapered sides.

12. The scanning force microscope probe of claim 1 wherein the second end is a free end of the cantilever.

13. The scanning force microscope probe of claim 1 wherein a front side of the cantilever is configured to be disposed near and spaced apart from a surface of a sample such that the cantilever is capacitively coupled to a signal line proximate to the surface of the sample.

14. The scanning force microscope probe of claim 1 wherein a front side of the cantilever is configured to be in contact with a surface of a sample such that the cantilever is coupled to a signal line proximate to the surface of the sample.

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15. A method of detecting motion of a scanning force microscope probe cantilever, the cantilever having a first end and a second end, the method comprising:

directing light to the cantilever in a first direction having a directional component from the first end to the second end of the cantilever;

reflecting at least a portion of the light from the cantilever in a second direction having a directional component from the second end to the first end of the cantilever; and

receiving the portion of the light reflected from the cantilever to detect motion of the cantilever.

16. The method of claim 15 wherein the first direction is substantially opposite to the second direction.

17. The method of claim 15 further comprising capacitively coupling the cantilever to a signal line proximate to surface of a sample.

18. The method of claim 15 further comprising capacitively coupling a tip included on a front side of the cantilever to a signal line proximate to a surface of a sample.

19. The method of claim 15 further comprising contacting a front side of the cantilever with a surface of a sample such that the cantilever is coupled to a signal line proximate to the surface of the sample.

20. The method of claim 15 wherein reflecting at least the portion of the light from the cantilever in the second direction includes reflecting

the light from a reflective structure disposed on the back side of the cantilever.

21. The method of claim 15 wherein reflecting at least the portion of the light from the cantilever in the second direction includes reflecting the light from a reflective structure disposed on the front side of the cantilever.

22. The method of claim 15 wherein reflecting at least the portion of the light from the cantilever in the second direction includes diffracting the light from a reflective structure disposed on the back side of the cantilever.

23. The method of claim 15 wherein the reflecting at least the portion of the light from the cantilever in the second direction includes diffracting the light from a reflective structure disposed on the front side of the cantilever.